

WE CLAIM:

1. A coolant system comprising:

a coolant system casing for housing at least the following components:

a plurality of coolant channels;

5 a plurality of feed channels; and

a first coolant manifold

wherein each of the plurality of feed channels intersects at least a first coolant  
channel and a second coolant channel, and wherein each of the plurality of  
coolant channels receives coolant from at least a first feed channel and a second  
10 feed channel; and

wherein the first coolant manifold is configured to provide coolant to the plurality  
of feed channels.

2. The coolant system of claim 1 wherein each of the plurality of feed  
channels intersects each of the plurality of coolant channels such that each coolant  
15 channel of the plurality of coolant channels is fed by each feed channel of the plurality of  
feed channels.

3. The coolant system of claim 1 further comprising a plurality of feed tubes,  
wherein a first end of each of the plurality of coolant feed tubes extends from the first  
coolant manifold and a second end of each of the plurality of coolant feed tubes intersects  
20 at least a first feed channel and a second feed channel of the plurality of feed channels  
such that coolant flows freely from the first coolant manifold, through the coolant feed  
tubes, to the plurality of feed channels.

4. The coolant system of claim 3 wherein the second end of each of the plurality of coolant feed tubes intersects each of the plurality of feed channels.

5. The coolant system of claim 1 wherein the plurality of feed channels are parallel to each other, and wherein each of the plurality of feed channels intersects the plurality of coolant channels at approximately one end of the coolant channels and at approximately right angles to the coolant channels.

6. The coolant system of claim 1 wherein the coolant system casing comprises:

a liner, wherein the liner contains the plurality of coolant channels and a top portion of the feed channels; and

a backup structure, wherein the backup structure contains a bottom portion of the feed channels and all other components comprising a coolant channel feed system, and wherein the backup structure is fixedly attached to the liner such that the top and bottom portions of the feed channels align.

7. The coolant system of claim 6 wherein the backup structure is brazed to the liner.

8. The coolant system of claim 1 wherein the coolant system casing comprises:

a liner, wherein the liner contains the plurality of coolant channels; and

a backup structure, which contains the feed channels and all other components comprising a coolant channel feed system, and wherein the backup structure is fixedly attached to the liner such that each of the plurality of feed channels intersects the plurality

of coolant channels at approximately one end of the coolant channels, and at approximately right angles to the coolant channels.

9. A coolant system comprising:

5 a coolant system casing comprising a liner and a backup structure bonded together;

a plurality of coolant channels within the coolant system casing;

10 a plurality of feed channels, wherein each of the plurality of feed channels intersects at least a first coolant channel and a second coolant channel, and wherein each of the plurality of coolant channels receives coolant from at least a first feed channel and a second feed channel;

at least a first coolant manifold; and

15 a plurality of coolant feed tubes, wherein a first end of each of the plurality of coolant feed tubes extends from the coolant manifold and a second end of each of the plurality of coolant feed tubes intersects at least a first feed channel and a second feed channel of the plurality of feed channels such that coolant flows freely from the manifold, through the coolant feed tubes, to the plurality of feed channels.

20 10. The coolant system of claim 9 wherein each of the plurality of feed channels intersects each of the plurality of coolant channels such that each coolant channel of the plurality of coolant channels is fed by each feed channel of the plurality of feed channels, and wherein the second end of each of the plurality of coolant feed tubes intersects each of the plurality of feed channels.

11. The coolant system of claim 9 wherein the plurality of feed channels are parallel and each of the plurality of feed channels intersects the plurality of coolant

channels at approximately one end of the coolant channels and at approximately right angles to the coolant channels.

12. The coolant system of claim 9 wherein the liner contains the plurality of coolant channels and the backup structure contains the plurality of feed channels, the first coolant manifold and the plurality of coolant feed tubes, and wherein the backup structure is fixedly attached to the liner such that each of the plurality of feed channels intersects the plurality of coolant channels at approximately one end of the coolant channels, and at approximately right angles to the coolant channels.

13. The coolant system of claim 9 wherein the liner contains the coolant channels and a top portion of the plurality of feed channels, and the backup structure contains a bottom portion of the plurality of feed channels the first coolant manifold and the plurality of coolant feed tubes, and wherein the backup structure is fixedly attached to the liner such that the top and bottom portions of the feed channels align.

14. A method for fabricating a coolant system comprising:

15 manufacturing a plurality of coolant channels into a liner;

manufacturing a first coolant manifold segment in a first side of a backup structure;

20 manufacturing a plurality of coolant feed tubes, wherein a first end of each of the plurality of coolant feed tubes opens into the first coolant manifold segment and a second end of each of the plurality of coolant feed tubes extends through the backup structure toward a second side of the backup structure;

bonding a second coolant manifold segment to the first manifold segment to create an enclosed coolant manifold;

manufacturing a plurality of feed channels into the second side of the backup structure, wherein the plurality of feed channels intersect the second end of each of the plurality of coolant feed tubes; and

5 bonding the liner to the backup structure such that each of the plurality of feed channels intersects at least a first coolant channel and a second coolant channel of the plurality of coolant channels.

15. The method for fabricating a coolant system of claim 14 wherein the plurality of coolant channels and the plurality of feed channels are manufactured by milling the channels in the liner and backup structure respectively.

10 16. The method for fabricating a coolant system of claim 14 wherein each of the plurality of feed channels intersects the plurality of coolant channels at approximately one end of the coolant channels, and at approximately right angles to the coolant channels.

15 17. The method for fabricating a coolant system of claim 14 wherein the plurality of coolant feed tubes are manufactured through electrical discharge machining.

18. The method for fabricating a coolant system of claim 14 wherein the bonding of the liner to the backup structure comprises brazing the components together.

20 19. The method for fabricating a coolant system of claim 14 wherein manufacturing the plurality of coolant feed tubes and the plurality of feed channels comprises casting the coolant feed tubes and feed channels.

20. The method for fabricating a coolant system of claim 14 wherein manufacturing a first coolant manifold segment in a first side of a backup structure comprises casting the coolant manifold segment.